Jan. 1, 1946. C. A. SNYDER 2,392,070

PORTABLE RADIAL DRILL APPARATUS

Filed Jan. 7, 1942 2 Sheets-Sheet 1

Fig. 1.

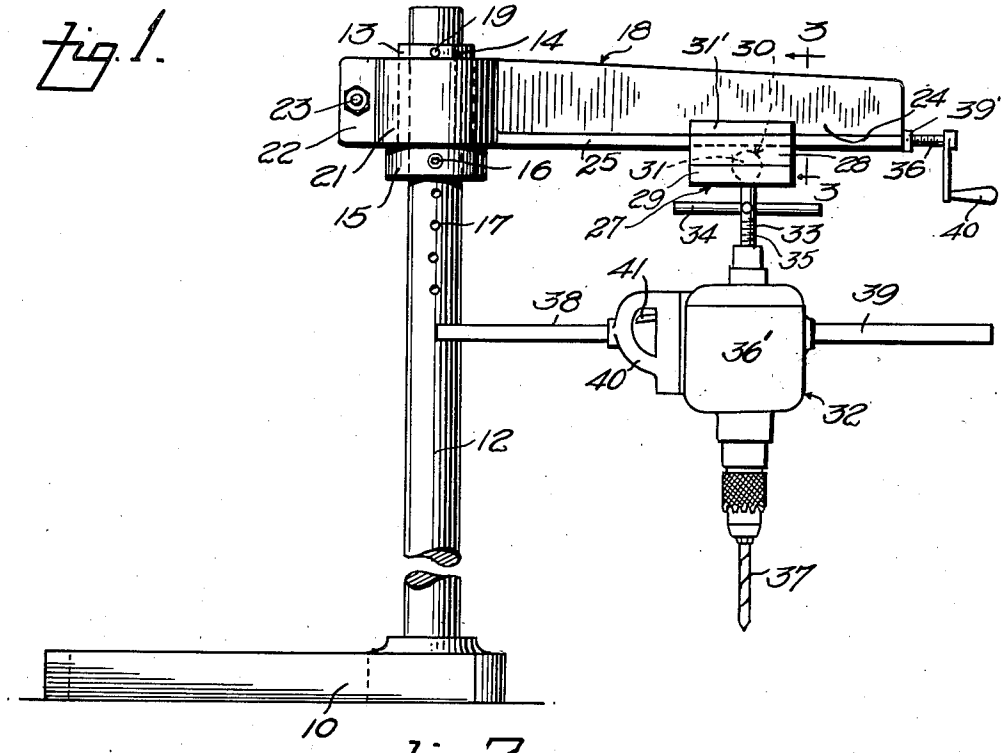


Fig. 2.

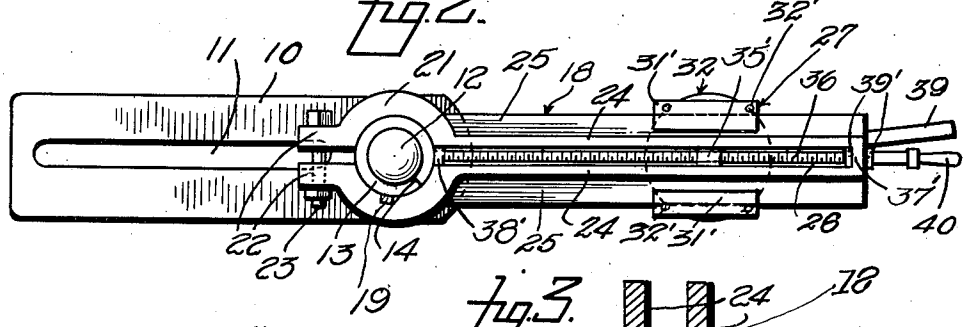


Fig. 3.

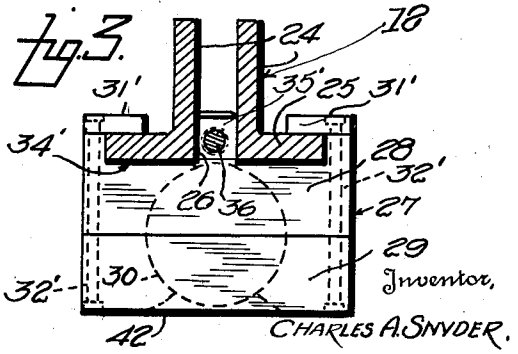
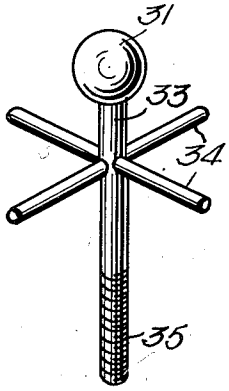


Fig. 4.



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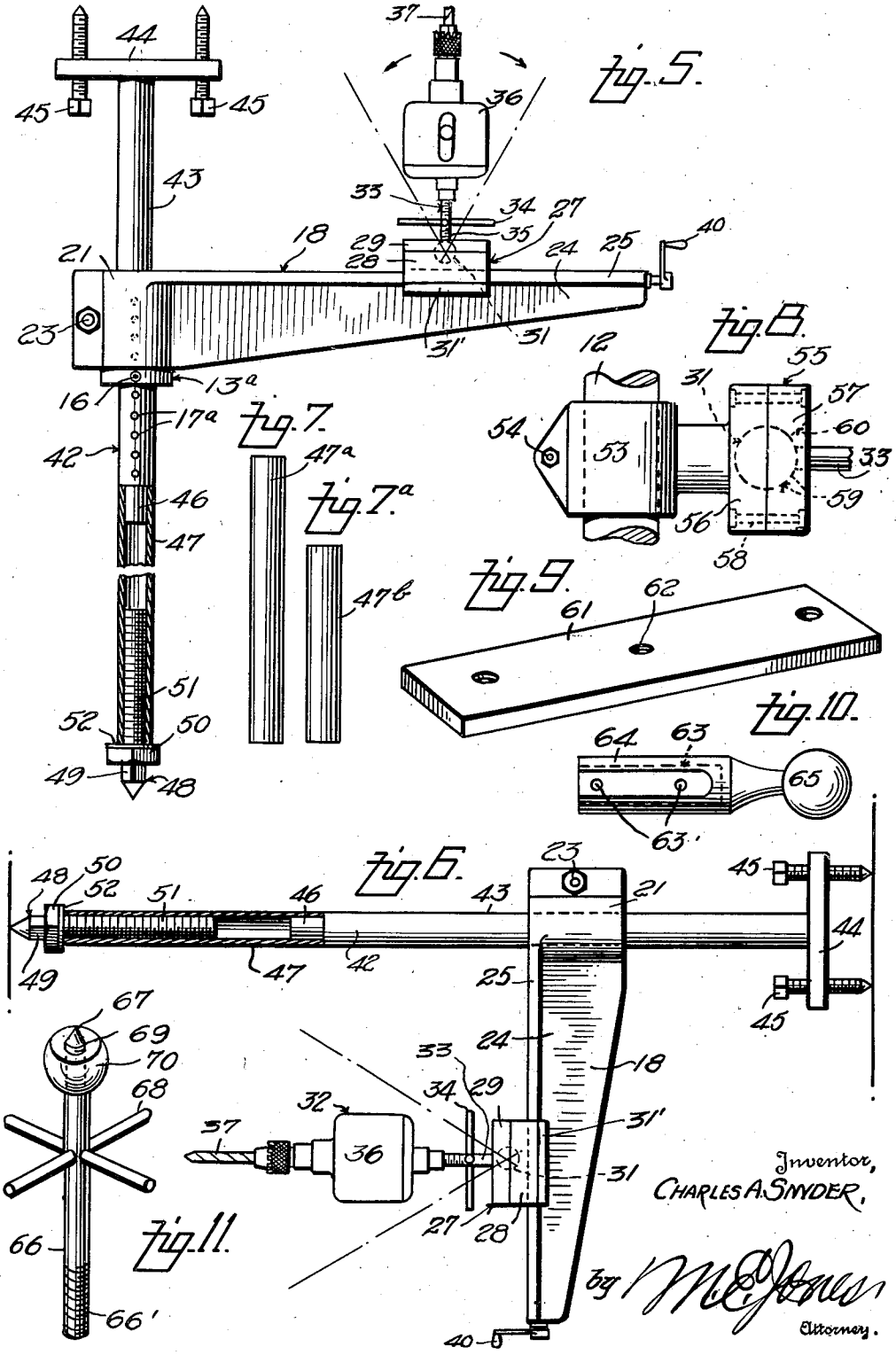
By

Attorney.

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PORTABLE RADIAL DRILL APPARATUS

Filed Jan. 7, 1942 2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,392,070

PORTABLE RADIAL DRILL APPARATUS

Charles A. Snyder, Louisville, Ky.

Application January 7, 1942, Serial No. 425,929

7 Claims. (Cl. 77—59)

This invention relates to a portable radial drill or improved old man.

It is aimed to provide structure having novel characteristics which may be embodied in many forms or variations and wherein the drill apparatus is connected to a mounting and usually is suspended in an elevated position and in a balanced condition.

A prime object is to provide such a construction wherein the connection of the drill apparatus to its mounting includes a ball and socket joint so that drilling at many different centers or locations may be effected from any position of the mounting.

Another object is to provide such a construction wherein the drill can not manually be fed faster than its rate of power drive, to avoid danger of undesirable lowering by gravity of the apparatus with consequent unduly fast passage of the drill to its limit in a complete or practically complete hole, thus reducing the danger of the drill breaking, catching on a bur, or injuring the workmen.

The construction provides a drill apparatus which automatically seeks the vertical in all positions of adjustment, and is adjustable from one position to various other positions in the same plane while following an arc or complete circle, and in some instances while also sliding in a path radially of the mounting.

In addition, I aim to provide such a structure as will enable operation by one man rather than two or more men, as is required at present, and a construction which generally increases production, while maintaining the construction relatively simple and inexpensive in manufacture and upkeep.

Various additional objects and advantages will become apparent and in part pointed out from a consideration of the description following, taken in connection with the accompanying drawings illustrating operative embodiments by way of example.

In said drawings:

Figure 1 is a side elevation of one form of my invention;

Figure 2 is a top or plan view thereof;

Figure 3 is an enlarged cross section taken on the plane of line 3—3 of Figure 1;

Figure 4 is a perspective view of the centering device for the drill apparatus;

Figure 5 is a view primarily in side elevation, but partly in section, of a modified form of the invention;

Figure 6 is a view similar to Figure 5, but showing the parts arranged for drilling horizontally rather than vertically;

Figures 7 and 7a are elevations of extensions of different lengths which may be used in the post of the form of Figures 5 and 6;

Figure 8 is a view primarily showing in side elevation, a modified form of support or bracket for the centering element for drill apparatus;

Figure 9 is a perspective view of a plate which may be used in connection with the present type of old man to slidably mount the block for the drill apparatus;

Figure 10 is an elevation of a ball device which may be attached to usual drill apparatus and be suspended from the block which travels on the plate of Figure 9; and

Figure 11 is a perspective view of a suspending device for drill apparatus, being so modified that, in addition to usual use, it may be used in accordance with the invention.

Referring specifically to the drawings, wherein like reference characters designate like or similar parts, and, first, to the form illustrated in Figures 1 to 4, 10 designates a base plate which is adapted to be clamped to a deck or any other support, as through the medium of screws passed through an elongated slot 11 therein. Rising rigidly from the base plate 10, is a post or upright 12. A bushing 13 is slidable and rotatable on the post 12, being slit or split, as at 14, so as to lightly contract about the post and frictionally grip the same to remain in different adjusted positions against accidental displacement, as during assembly. Such bushing has a basal enlargement or outwardly extending flange 15 in which a set screw 16 is adjustably screw threaded so that its inner end may be moved into or withdrawn from any opening or notch of a series 17 thereof provided longitudinally of the post 12, to enable adjustment and fastening of the bushing 13 at any permissible elevation along such post.

An arm or bracket 18 for supporting drill apparatus is mounted by said bushing 13. This bracket or arm may be held on the bushing against accidental displacement by a removable screw or pin 19, and, in addition, said arm or bracket has a split clamp portion at 21, generally of cylindrical form, whereby it is rotatably adjustable to any desired extent about the axis of the bushing 13. Arm or bracket 18 rests on the flange 15, and at its split end has ears 22 provided with openings through which a bolt 23 passes for tightening, to clamp the bracket or arm to the bushing, either tightly or to a degree to effectively journal it. When tightly clamped,

the bracket will move as a unit with the bushing 13, but when the bolt 23 is loose, the bracket can be freely turned on the bushing to any angle or adjusted position.

Bracket or arm 18, by way of example, may have a pair of spaced vertical webs 24 with outwardly extending flanges or rails 25 at the base thereof, and the base wall of the bracket is open or provided with a longitudinal slot at 26. A sectional block 27 is slidable longitudinally on the rails 25 of bracket 18 and is suspended therefrom. Block 27 consists of separable sections 28 and 29, recessed to provide a spherical cavity, partly in each of them, as at 30, and in which cavity a ball 31 is swiveled in the manner of a ball and socket joint. In addition to the sections 28 and 29, block 27 has strips or cleats 31' which overlap the flanges 25. Bolts 32', of any desired number, removably secure the sections 28 and 29 together and fasten the cleats 31' to the plate 28. It will be noted that the upper surface of plate 28 is recessed at 34', to fit the lower surface of the bracket 18 and that a lug 35' rises centrally from the plate 28 and is disposed and movable in the slot 26. Screw threaded in an opening in lug 35' is a screw rod 36 which is operable to slide the block 27 along the bracket or arm 18 to dispose the same in any adjusted position. Said screw rod 36 is journaled adjacent opposite ends in bearing portions 37' and 38' on arm 18, and it is maintained against displacement by collars 39'. An operating crank 40 is provided on the rod 36.

Said ball 31 constitutes part of a centering head or element for drill apparatus disclosed at 32. Such suspending element, in addition to the ball 31, includes a rod 33 having handles 34 radiating therefrom and having screw threads 35 at the lower end thereof.

The drill 32 is of any desired or conventional form generally having a housing 36' in which an operative electric or other motor (not shown) is disposed. The drill is shown at 37 and oppositely radiating handles are illustrated at 38 and 39, the casing or housing 36' having an enlargement 40' between the same and handle 38 to accommodate a control switch 41 and other parts. The screw threaded portion 35 detachably engages suitable screw means provided at the top of the housing 36'. Through the rotation of rod 33, by operation of handles 34, the screw threads 35 will adjustably position the drill apparatus 32 at different heights. It will be realized that the section 29 is annularly cut away or open at 42, to permit movement of the rod 33 to various angles or positions as the ball 31 swivels in the cavity 30.

In using the device, the drill apparatus 32 is adjusted to any desired height through the turning of handles 34 and/or through the vertical adjustment of arm 18 through the engagement of screw 16 in recesses 17. At the same time, the drill apparatus may be moved radially of the post 12 through the sliding of block 27 effected by turning screw rod 36. Said arm 18 may also be further adjusted through the rotation thereof on the bushing 13. It will be realized that the drill is operable by one man and that the handle 38 may be disposed in contact with post 12 to brace and steady the drill apparatus during use. Attention is called to the fact that the drill apparatus, as a whole, will always seek and remain in vertical position, when suspended as in Figure 1, and that the drill 37 is incapable of manual feeding at a rate faster than its permissible power driving. Accordingly, the drill apparatus will not drop in use as a hole is completed. The construction enables the drilling of holes from a plurality of centers at a single adjustment of the supporting apparatus for the block 27 and drill apparatus. Furthermore, since the drill apparatus and drill 37 are mounted so that they cannot accidentally drop or be rapidly pushed downwardly, the drills will not catch in burs at the end of drilling operations, two men are not necessary to operate the drill and operation is more rapid, the danger of injury to workmen and the danger of injuring and breaking drills is greatly minimized.

It is to be understood that I have illustrated and described the structure of Figures 1 to 4, by way of example only, since the principles and characteristics of the invention may be embodied and carried out in various forms. One such modification or varied form is illustrated in Figures 5, 6, 7 and 7a. In such form of Figures 5 to 7a, I employ the arm 18 in connection with a bushing 13a in lieu of bushing 13. Arm 18 in this form of the invention mounts parts corresponding to those of the preceding form and, accordingly, the same reference characters have been applied thereto. It will be obvious that, in the first form of Figures 1 to 4, arm 18 may be inverted for overhead drilling, and the drill apparatus in Figure 5 is shown in position for such overhead drilling, since the arm 18 is inverted with respect to its position in the first form. In lieu of the mounting post 12 and base 10, I employ in the modified form, a post or the equivalent 42. This post has a main section 43 provided with a head 44 at one end, in which screws 45 are threaded. Such section 43 has openings or recesses 17a corresponding to those at 17 for coaction with the screw or element 16 to adjustably fasten the sliding bushing 13 in place. Section 43 has a reduced lug 46 which removably enters an end of a removable extension in the form of a tube 47. An anchoring spur 48 is carried at the lower end of extension tube 47, having a square or wrench engaging portion 49 and it also has a nut 50 engaging screw threads 51 on the spur. The screw threaded portion 51 extends loosely and slidably into the tubular extension 47. The spur may be adjusted for extension or retraction by the operation of wrenches engaged, respectively, with the square portion 49 and nut 50. A washer 52 may surround the spur intermediate the nut 50 and extension tube 47.

When the drill 36 is arranged for vertical drilling, either below or overhead, the spur 48 is engaged with a deck, floor, or the like, while the screws 45 are engaged with the ceiling or other support. In addition to the adjustment afforded through the operation of the nut 50, the tube 47 may be supplied in any desired length. For instance, tubes 47a and 47b, of different lengths from that of tube 47, as shown in Figures 7 and 7a, respectively, may be substituted.

Attention is called to the fact that the structure of Figures 5 to 7a may be used either in vertical drilling, as shown in Figures 5, or for horizontal drilling, as shown in Figure 6, in the latter event, the spur 48 and screws 45 usually being anchored to opposed vertical walls or other supports. Such structure may also be mounted at various other angles, as will be apparent.

In Figure 8, another modification is disclosed. In such figure, the post 12 is shown fragmentary but this may equally as well be the post 42. A split clamp 53 is slidable and rotatable along the

post and it may be clamped in any adjusted position by tightening the nut of a bolt 54. Clamp 53 carries a block designated 55, consisting of a section or plate 56 integral with the clamp and a removable section 57 secured thereto by bolts 58. Sections or plates 56 and 57 provide a spherical recess or socket 59 in which the ball 31 is accommodated for swiveling, as in the preceding forms of the invention, the plate 57 having an enlarged round opening or cut away portion 60 through which stem 33 passes and operates. It will also be seen, that the drill apparatus 36 and centering element therefor is connected in place by securing ball 31 in socket 59.

In order that the known construction of old man may mount a drill apparatus, I provide a plate 61, as in Figure 9, to be fastened to a supporting part by elements passed through openings 62. The opposite edge portions of plate 61 will function or provide rails like those at flanges 25, so that the block 27 will be slidably mounted thereon, usually without screw adjustment therefor. In such event, the usual or conventional centering head carried by the drill apparatus 36 has its upper or spur end extended into a recess 63 of the arm 64 equipped with a ball 65 swiveled in the block 27 in the same manner as the ball 31, in order to similarly function. Arm 64 is removably clamped to such conventional head by means of screws or fastenings passed through openings 63' in the arm.

Conventional drill apparatus has a centering head consisting of a rod 66 screwed thereto at 66', as shown in Figure 11, similar to the threads 35. Such conventional rod 66 at one end has a spur 67 adapted to be manually held in engagement with an abutment. This conventional rod has handles 68. In order that the rod 66 may function in the conventional manner and may also be used to carry out my invention, I reduce the spur end of the rod and screw thread the same at 69. On the screw thread 69, a ball or head having a spherical surface 70 is fastened. The presence of the spur 67 does not interfere with the mounting or swiveling of the ball 70 in the slide block, such as 27.

I claim as my invention:

1. Mechanism of the class described comprising a supporting bracket having an elongated slot and laterally extending flanges, a block slidably mounted on the bracket having means bearing against opposite sides of said flanges and overlapping the upper and lower surfaces of the latter, said block having a lug entered in said slot and contacting the opposite walls of the bracket defining the slot, a rod journaled at locations on opposite sides of the lug on the bracket in the slot and interengaged with said lug to slide the block through the turning of the rod, said block comprising sections collectively forming a central socket greater than a semi-circle having its defining wall extending relatively close to the bracket, and a ball on the drill apparatus swiveled and retained in said socket.

2. Mechanism according to claim 1, wherein said bracket has a split attaching clamp at one end, webs extending from said clamp defining said slot between them and from which the flanges extend.

3. A centering head for drill apparatus, said head including a centering spur, and means on the head inwardly of and relatively close to the spur provided with a spherical surface enabling swivel mounting of the head, said spur being enclosed in the sphere of said surface so that said means and spur will be operable in a socket without interference by said spur.

4. A centering head for drill apparatus, said head including a centering spur, and means on the head inwardly of and relatively close to the spur provided with a spherical surface enabling swivel mounting of the head, said spur being enclosed in the sphere of said surface so that said means and spur will be operable in a socket without interference by said spur, consisting of an auxiliary head, and means detachably securing the auxiliary head to the centering spur.

5. Apparatus of the class described, comprising a mounting rod, fastening means at opposite ends of the rod, an arm adjustably mounted by the rod, drill apparatus mounted by the arm, one of said fastening means consisting of a spur, a nut threaded on said spur and in engagement with the adjacent end of the rod, said rod having a tubular section separable from the remainder thereof to enable the arm to be selectively mounted in normal and inverted positions and said spur being directly carried by the tubular section.

6. Apparatus of the class described comprising a post having spaced recesses, a bushing slidable on said post, means selectively engageable with said recesses to adjustably position said bushing, an outwardly extending flange on said bushing, an arm having means to mount it on the bushing in a normal and inverted position, said arm having a vertical slot and along opposite edges having laterally extending flanges, and a drill-carrying block having a portion extending into the slot and engaging the opposite vertical walls therein and interengaged with said flanges at the outer sides, and upper and lower surfaces thereof for sliding along said arm.

7. Apparatus of the class described comprising a post, an arm having means to surround said post, said arm having a vertical slot and along edges having laterally extending flanges, a drill-carrying block having a portion extending into the slot and engaging the opposite vertical walls therein and interengaged with said flanges for sliding longitudinally of the arm, said arm being capable of assuming a normal and an inverted position relatively to the post, and means to support said arm adjustably on said post in both positions.

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